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Development of a holistic communication score (HoCoS) in patients treated for oral or oropharyngeal cancer: *preliminary validation*

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CONTEXT

▪ Cancer of oral cavity and oropharynx

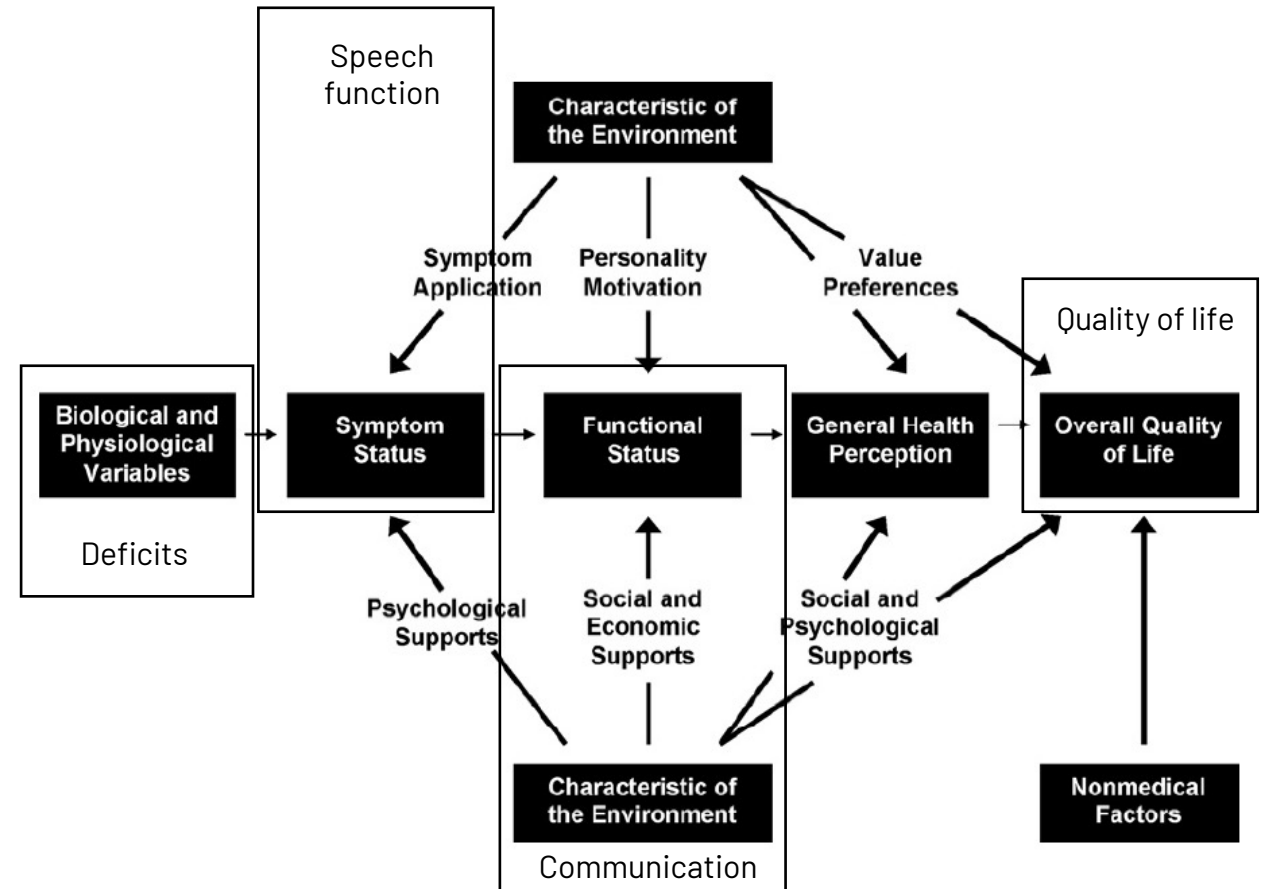
- High incidence: > 475,000 new cases worldwide in 2020 (*Global Cancer Observatory 2020, World Health Organization*)
- Degrade speech function (*Mlynarek et al., 2008*)

▪ Bio-psycho-social models consider functional and psychosocial repercussion

- ICF (*World Health Organization, 2001, Murphy et al., 2007*)

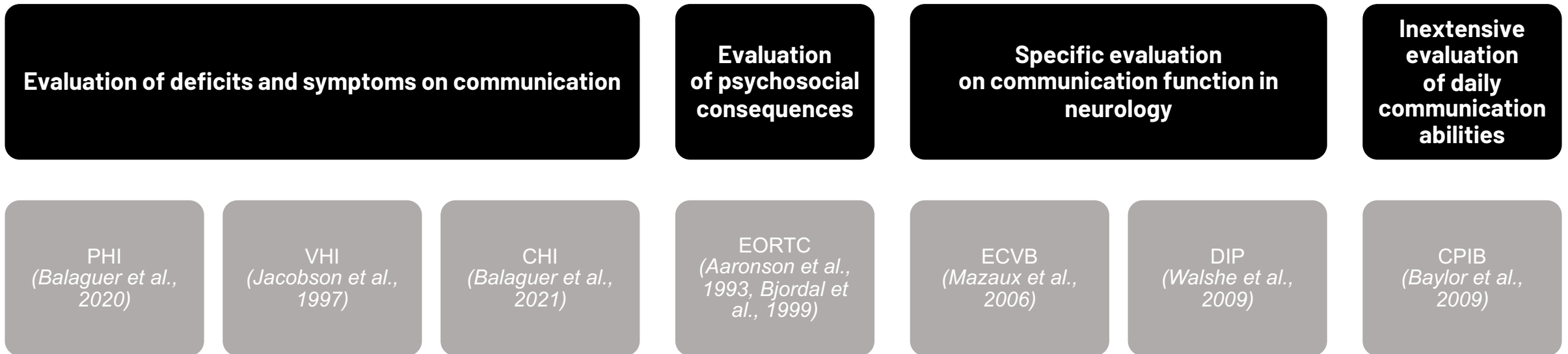
▪ Patients live longer with the consequences of their pathology or its treatment (*Borggreven, 2007*)

- **Communication abilities** have to be considered in daily care (*Eadie, 2018*)



CONTEXT

- **Few tools exist** to assess the functional impact on communication abilities (*Bolt et al., 2016, Meyer et al., 2004*)



- How to **“score” the communication?**

- Many questionnaires result in scores by item or global scores, by addition or average
→ *each item carries the same weight on communication alteration*

OBJECTIVE

**To develop a holistic communication score
measuring the functional impact of speech disorders on communication
in patients treated for oral or oropharyngeal cancer**

Construction

Preliminary validation

- ANR “RUGBI” project (grant ANR-18-CE45-0008)
 - Reviewed and approved by the Committee for the Protection of Persons [CPP: Ouest IV, 19/02/2020, reference 11/20_3]

METHODS



Inclusion criteria

- Patients coming for **consultation** or **hospitalization** in ENT department
- **At least 18 y.o.**
- Having been **treated for OC/OP cancer** for **at least 6 months**



Non-inclusion criterion

- Patients with **other associated chronic disease**

METHODS

1

Selection process of questionnaires

- Communication-related questionnaires: ECVB, DIP
- Questionnaires assessing speech function: PHI, CHI
- Quality of life questionnaires: EORTC QLQ-C30, QLQ-H&N35

METHODS

1

Selection process of questionnaires

2

Construction of the score

- **Face validity**
 - 9 experts
 - Consensus definition of communication abilities in oral/oropharyngeal cancer
 - Individual selection of items
I-CVI >0,77 (*Lynn, 1986, Polit et al., 2007*); Kappa of agreement $\geq 0,81$ (*Landis & Koch, 1977*)
- **Construct validity**
 - Elimination of redundant and/or insufficiently variable items
- **Elaboration** of the holistic communication score (HoCoS)
 - Principal-component factor (PCF) analysis (latent variable)
 - Prediction of HoCoS scores by regression analysis on the set of new variables (1st factor)

METHODS

1

Selection process of questionnaires

2

Construction of the score

3

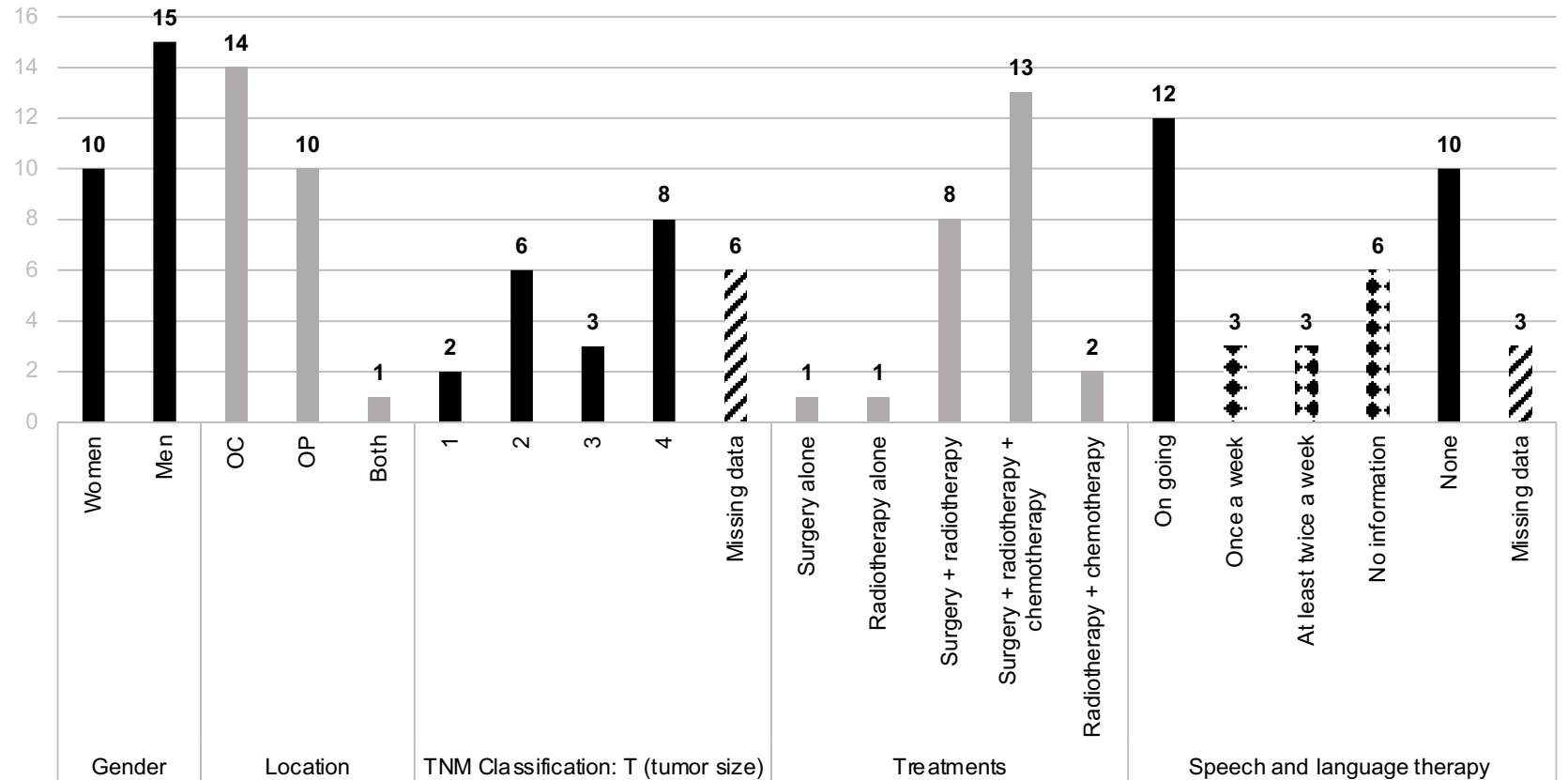
Validation of the score

- 5-fold cross validation (reliability)
- Latent profile analysis (LPA, *Cai, 2012*)
 - To compare performances of a qualitative HoCoS (from the LPA) and the quantitative HoCoS

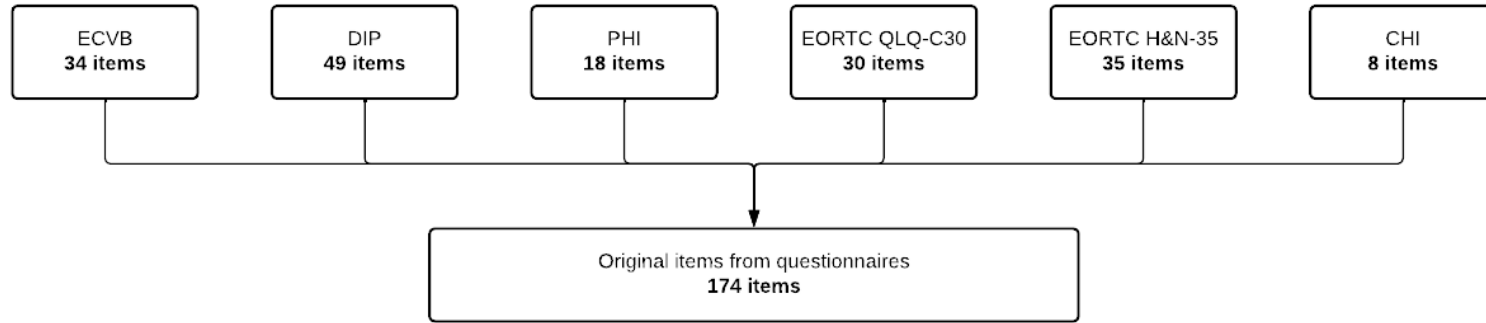
RESULTS

Characteristics of the participants (n = 25)

- Median age: 67 y.o., IQR: 12
- Average time since treatment: 87.2 months



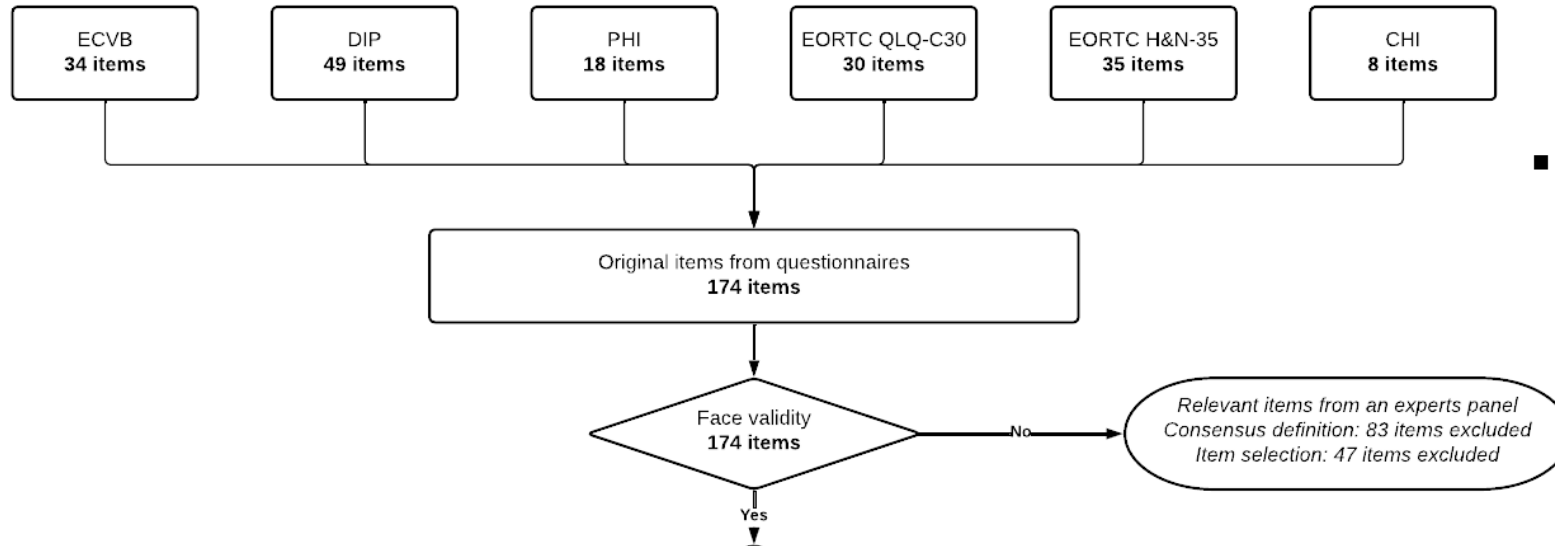
RESULTS



- **Original items** from questionnaires

174

RESULTS



▪ Face validity

▪ Communication here defined as

- Relating to oral communication
- Relating to expression
- Relating to interaction between speaker and interlocutor, even if implicit

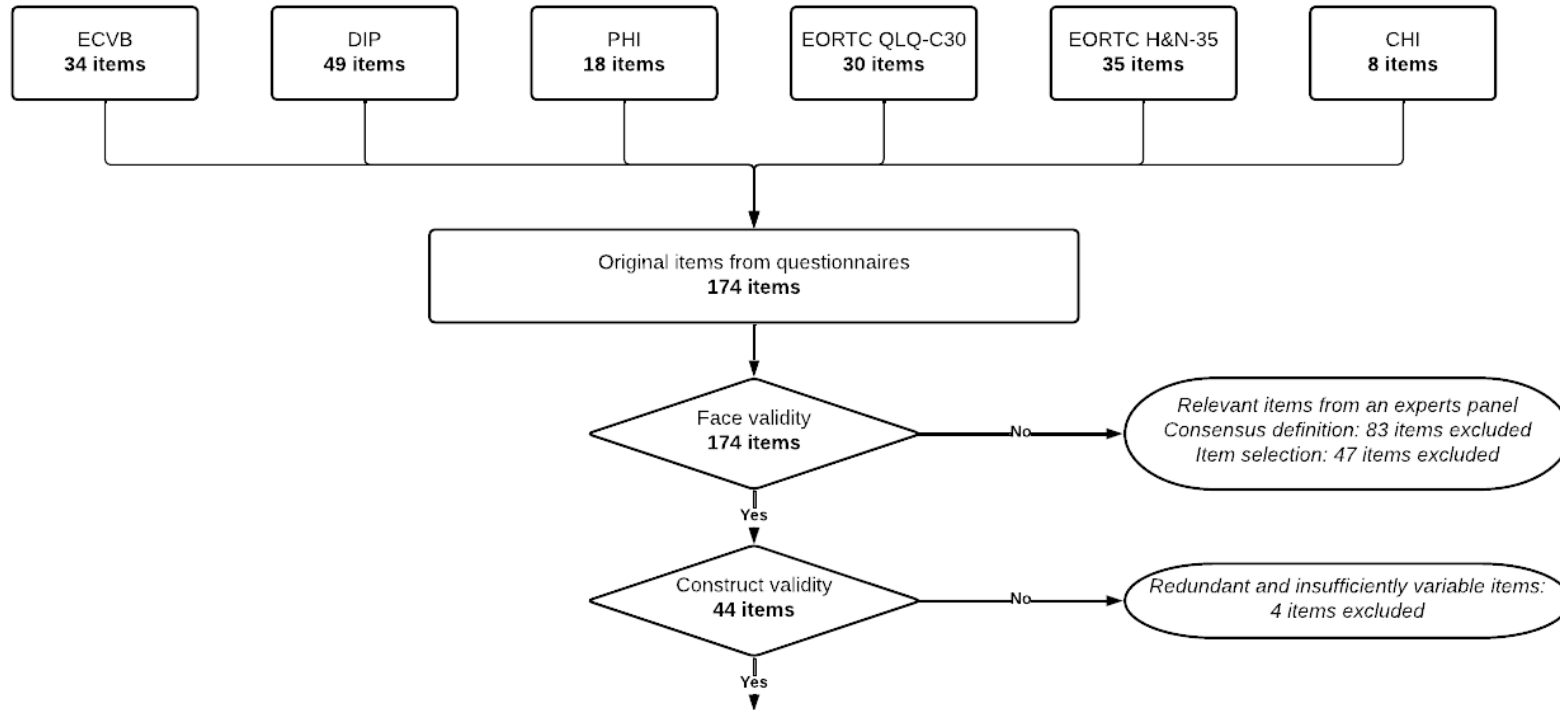
▪ Online questionnaire

- Items retained (I-CVI, Kappa of agreement)

174

44

RESULTS



174

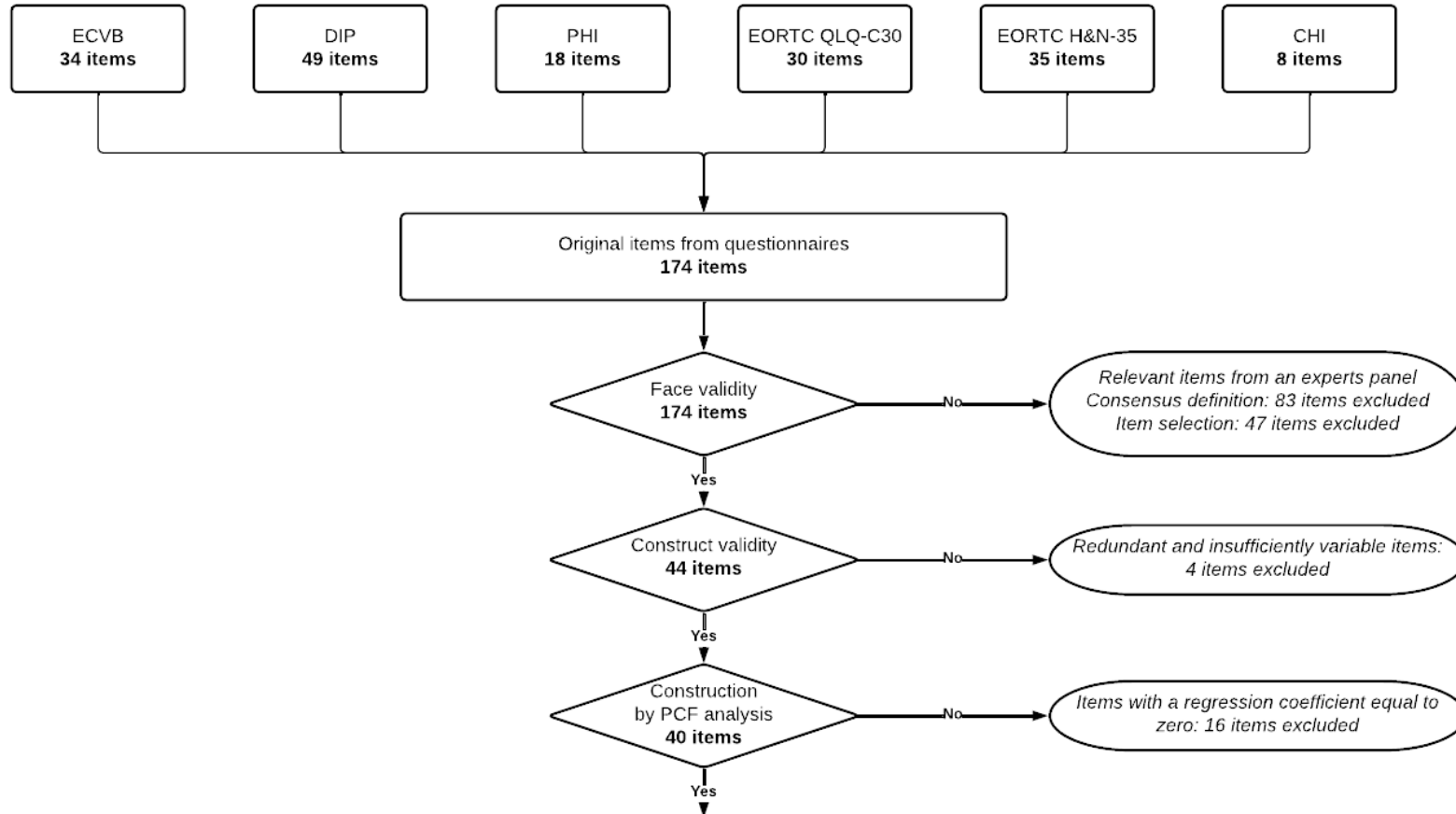
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40

▪ Construct validity

- Non redundant ($r_s \geq .90$)
- Sufficiently variable

RESULTS



174

44

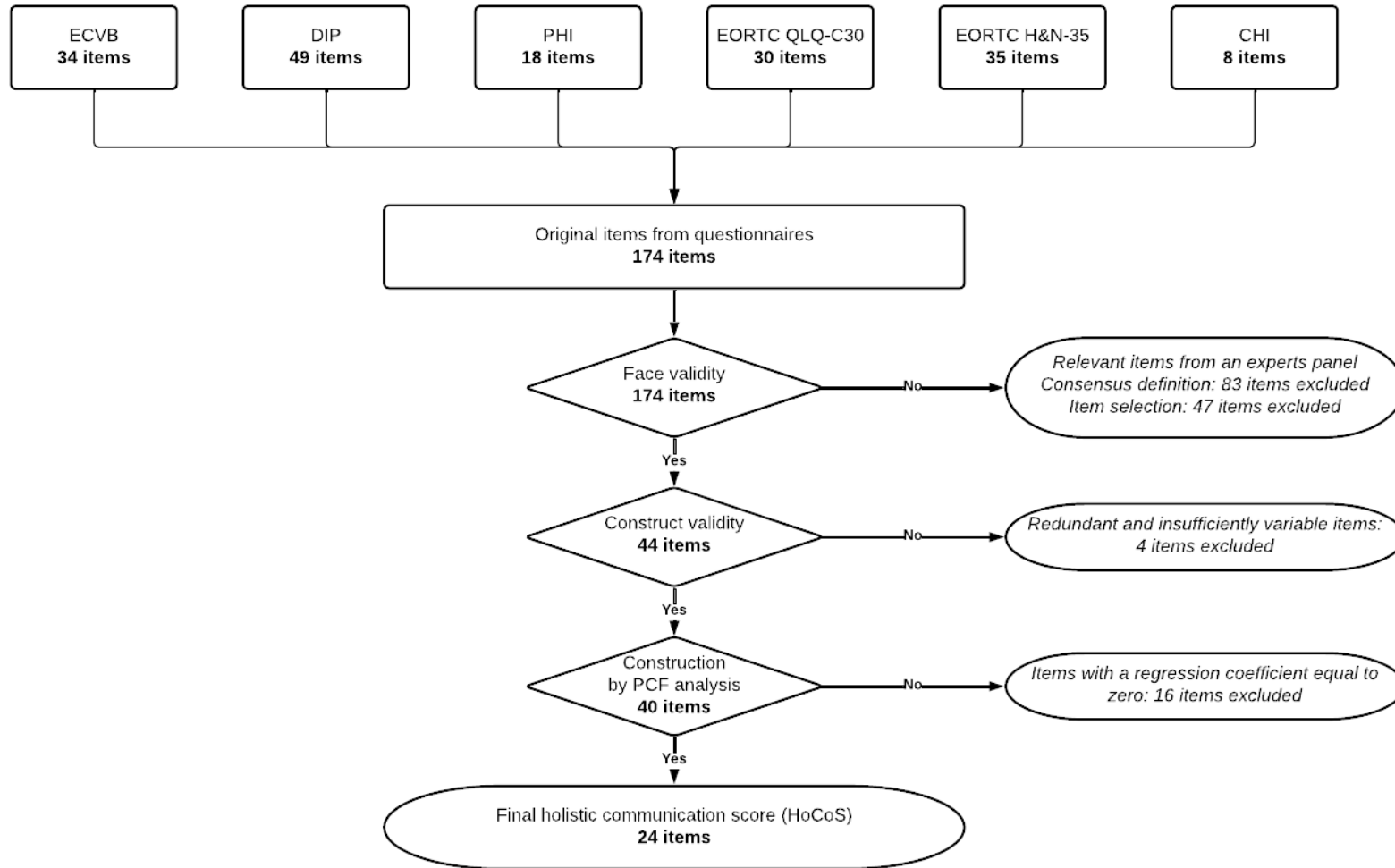
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▪ Elaboration of the score (1/2)

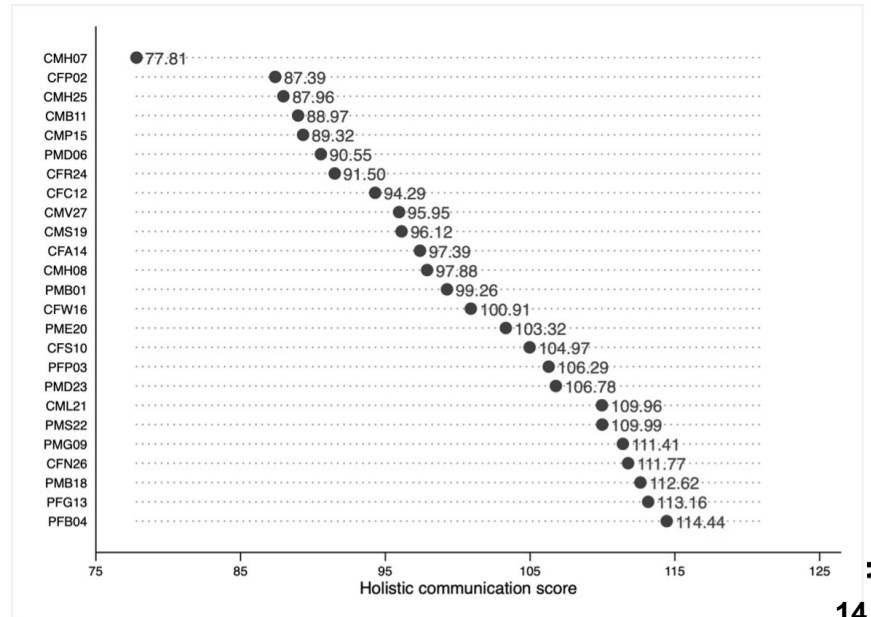
- Prediction of values for factor 1 (PCF analysis, Roscoe, 1982)
 - Retained items: non-zero coefficient

RESULTS



Elaboration of the score (2/2)

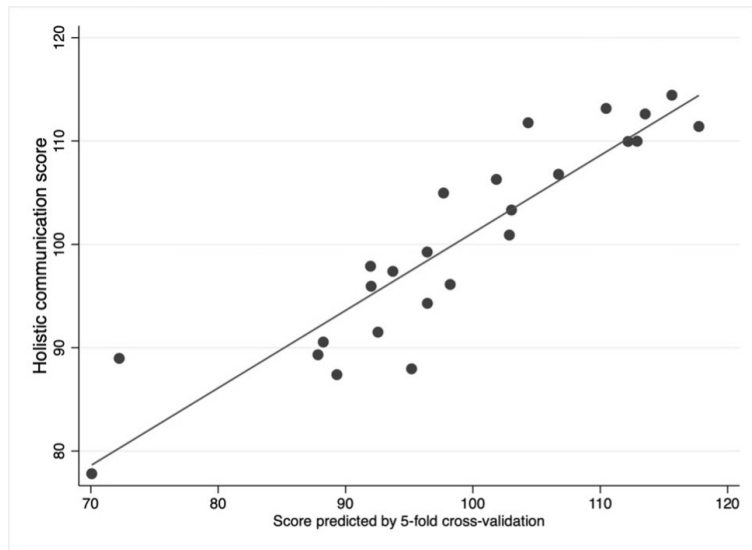
- Predicted HoCoS
 - Centered on 100
 - SD = 10
 - *The higher the score, the better the communication abilities are perceived*



RESULTS

Validation

- $r_s = .91$ (HoCoS / predicted values 5-fold cross-validation)



- Latent profile analysis

Subject	Predicted class	HoCoS
CMH07	1	77.81
CFP02	1	87.39
CMH25	1	87.96
CMB11	1	88.97
CMP15	1	89.32
PMD06	1	90.55
CFR24	1	91.50
CFC12	1	94.29
CMV27	2	95.95
CMS19	2	96.12
CFA14	2	97.39
CMH08	2	97.88
PMB01	2	99.26
CFW16	2	100.91
PME20	2	103.32
CFS10	3	104.97
PFP03	3	106.29
PMD23	3	106.78
CML21	3	109.96
PMS22	3	109.99
PMG09	3	111.41
CFN26	3	111.77
PMB18	3	112.62
PFG13	3	113.16
PFB04	3	114.44

1

2

3

DISCUSSION

1 Psychometrics

- **Good performances in validity and reliability**
 - High correlation in cross-validation ($r_s = .91$)
 - Validity confirmed by LPA

2 Limitations

- **Limited sample**
 - Need to increase the sample size
- **External validation** on a new set of patients
- Analysis of **temporal reliability**

DISCUSSION

3 Perspectives

- **Including both speaker and interlocutor** in communication abilities assessment
- **Specifying** the communication assessment using indicators related to **individual and environmental context** (according to the bio-psychosocial models)
- **Allowing an easier customization** of patients' therapeutic strategies

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- Aaronson NK, Ahmedzai S, Bergman B, Bullinger M, Cull A, Duez NJ, et al. The European Organization for Research and Treatment of Cancer QLQ-C30: A Quality-of-Life Instrument for Use in International Clinical Trials in Oncology. *JNCI J Natl Cancer Inst* [Internet]. 1993 Mar 3;85(5):365–76. Available from: <http://jnci.oxfordjournals.org/content/85/5/365.short>
- Balaguer M, Farinas J, Fichaux-Bourin P, Puech M, Pinquier J, Woisard V. Validation of the French Versions of the Speech Handicap Index and the Phonation Handicap Index in Patients Treated for Cancer of the Oral Cavity or Oropharynx. *Folia Phoniatr Logop* [Internet]. 2020;72(6):464–77. Available from: <https://www.karger.com/Article/FullText/503448>
- Balaguer M, Champenois M, Farinas J, Pinquier J, Woisard V. The (head and neck) carcinologic handicap index: validation of a modular type questionnaire and its ability to prioritise patients' needs. *Eur Arch Oto-Rhino-Laryngology* [Internet]. 2021 Apr 14;278(4):1159–69. Available from: <http://link.springer.com/10.1007/s00405-020-06201-6>
- Baylor CR, Yorkston KM, Eadie TL, Miller RM, Amtmann D. Developing the Communicative Participation Item Bank: Rasch Analysis Results From a Spasmodic Dysphonia Sample. *J Speech, Lang Hear Res* [Internet]. 2009 Oct;52(5):1302–20. Available from: <http://pubs.asha.org/doi/10.1044/1092-4388%282009/07-0275%29>
- Bjordal K, Hammerlid E, Ahlner-Elmqvist M, de Graeff A, Boysen M, Evensen JF, et al. Quality of Life in Head and Neck Cancer Patients: Validation of the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-H&N35. *J Clin Oncol* [Internet]. 1999 Mar;17(3):1008–1008. Available from: <http://ascopubs.org/doi/10.1200/JCO.1999.17.3.1008>
- Bolt S, Eadie T, Yorkston K, Baylor C, Amtmann D. Variables associated with communicative participation after head and neck cancer. *JAMA Otolaryngol Neck Surg* [Internet]. 2016 Dec 1;142(12):1145–51. Available from: <http://archotol.jamanetwork.com/article.aspx?doi=10.1001/jamaoto.2016.1198>
- Borggreven, P. A., Verdonck-De Leeuw, I. M., Muller, M. J., Heiligers, M. L. C. H., De Bree, R., Aaronson, N. K., & Leemans, C. R. (2007). Quality of life and functional status in patients with cancer of the oral cavity and oropharynx: Pretreatment values of a prospective study. *European Archives of Oto-Rhino-Laryngology*, 264(6), 651–657. <https://doi.org/10.1007/s00405-007-0249-5>
- Cai L. Latent variable modeling. *Shanghai Arch Psychiatry*. 2012;24(2):118–20.
- Eadie T, Faust L, Bolt S, Kapsner-Smith M, Pompon RH, Baylor C, et al. Role of Psychosocial Factors on Communicative Participation among Survivors of Head and Neck Cancer. *Otolaryngol Neck Surg* [Internet]. 2018 Aug 20;159(2):266–73. Available from: <http://journals.sagepub.com/doi/10.1177/0194599818765718>
- Jacobson B, Johnson A, Grywalski C, Silbergleit A, Jacobson G, Benninger M, Newman C. The Voice Handicap Index (VHI). *American Journal of Speech-Language Pathology*. 1997;6(3):66-70. <https://doi.org/10.1044/1058-0360.0603.66>
- Landis JR, Koch GG. The Measurement of Observer Agreement for Categorical Data. *Biometrics*. 1977;33(1):159.
- Lynn MR. Determination and quantification of content validity [Internet]. Vol. 35, *Nursing Research*. 1986. p. 382–6. Available from: <http://ijoh.tums.ac.ir/index.php/ijoh/article/view/26>
- Mazaux J-M, Daviet J-C, Darrigrand B, Stuit A, Muller F, Duthiel S, et al. Difficultés de communication des personnes aphasiques. *Évaluation Des Troubl Neuropsychol En Vie Quotidienne*. 2006;73–82.
- Meyer TK, Kuhn JC, Campbell BH, Marbella AM, Myers KB, Layde PM. Speech intelligibility and quality of life in head and neck cancer survivors. *Laryngoscope*. 2004;114(11 I):1977–81.
- Mlynarek A, Rieger J, Harris J, O'Connell D, Al-Qahtani K, Ansari K, et al. Methods of functional outcomes assessment following treatment of oral and oropharyngeal cancer: review of the literature. *J Otolaryngol - Head Neck Surg*. 2008;37(1):2–10.
- Murphy BA, Ridner S, Wells N, Dietrich M. Quality of life research in head and neck cancer: A review of the current state of the science. *Crit Rev Oncol Hematol*. 2007;62(3):251–67.
- Polit DF, Beck CT, Owen S V. Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Res Nurs Health* [Internet]. MIT Press. 2007 Aug;30(4):459–67. Available from: <http://doi.wiley.com/10.1002/nur.20199>
- Pommée T, Balaguer M, Maclair J, Pinquier J, Woisard V. Assessment of adult speech disorders: current situation and needs in French-speaking clinical practice. *Logopedics Phoniatrics Vocology*. 2022, 47(2):92-108. Available from: <https://doi.org/10.1080/14015439.2020.1870245>
- Roscoe BA, Hopke PK, Dattner SL, Jenks JM. The Use of Principal Component Factor Analysis to Interpret Particulate Compositional Data Sets. *J Air Pollut Control Assoc*. 1982;32(6):637–42.
- Walshe M, Peach RK, Miller N. Dysarthria Impact Profile: development of a scale to measure psychosocial effects. *Int J Lang Commun Disord* [Internet]. 2009 Jan;44(5):693–715. Available from: <http://doi.wiley.com/10.1080/13682820802317536>
- World Health Organization. International Classification of Functioning, Disability and Health : ICF [Internet]. World Health Organization. 2001. Available from: <https://apps.who.int/iris/handle/10665/42407>